

RESULTS OF THE 2002 HAWAII CHILD RESTRAINT USE SURVEY

Report to the Department of Transportation
State of Hawaii

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I. INTRODUCTION

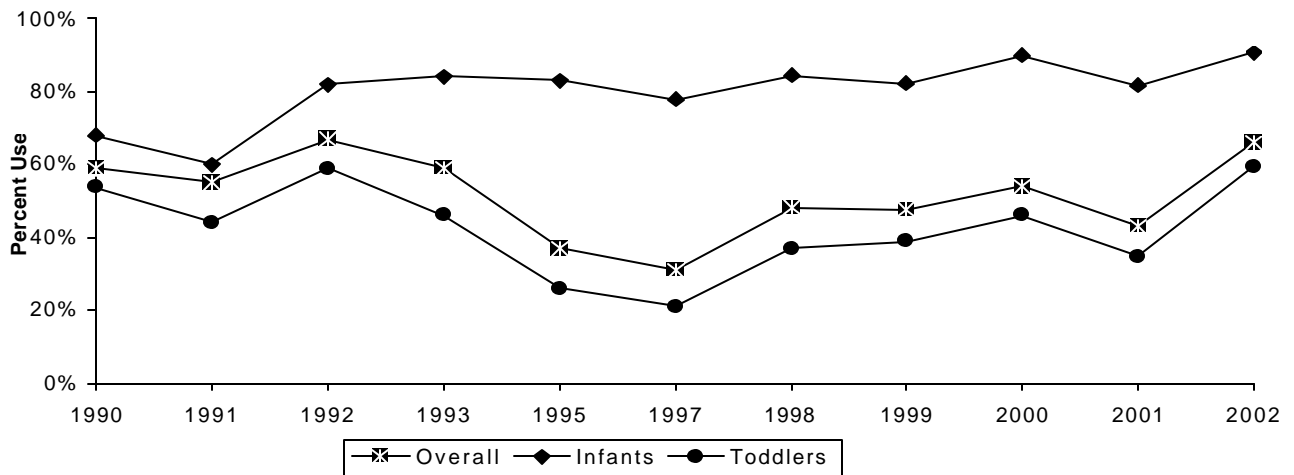
This report contains the results of the 2002 Child Restraint Use Survey in Hawaii. Hawaii's child restraint law (HRS§291-11.5) requires all children under the age of four to be secured in a child safety seat when riding in a vehicle. In addition to child seat use requirements, a separate law mandates that youth between the ages of 4 and 17 be harnessed by a seat belt if they are seated in the rear (HRS§291-11.6). This is the second observation period in which the youth seat belt law has been in effect.

In order to measure child restraint use levels, the University of Hawaii's Department of Urban and Regional Planning (DURP) collected and analyzed 1,122 observations of infants (<1 year) and toddlers (1-3 years), as well as 1,422 youth in motor vehicles at 15 shopping malls throughout the state. Observations were conducted on Oahu, Maui, Hawaii, and Kauai during January and February of 2002. Cars containing infants and toddlers were observed for child seat use. To ensure compatibility of data across time, this survey employed methods similar to the ones used in previous studies conducted annually since 1990. However, this year, new Palm technology was integrated into data collection.

II. SUMMARY

The 2002 child seat survey saw marked gains in restraint use among children. The overall compliance rate for infants (<1 year) and toddlers (1-3 years) in the 2002 survey dramatically increased from 43.2% (2001) to 66.0% (2002). The percentage of restrained infants increased from 81.8% (2001) to 90.9% (2002). In addition, the percentage of compliant toddlers increased from 34.8% (2001) to 59.5% (2002). New peaks were established in infant and toddler restraint use rates for the 2002 survey period. However, the overall child restraint rate did not surpass the peak rate of 67.0% established in 1992. See Figure 1.

FIGURE 1
OVERALL CHILD RESTRAINT BY YEAR, 1990-2002



III. METHODOLOGY

A total of 15 child restraint sites were selected throughout the state (8 sites on Oahu, 2 on Maui, 3 on Hawaii, and 2 on Kauai). All observations were conducted at neighborhood and regional shopping centers. Site selection was based on three objectives: (1) to ensure adequate counts to enable statewide and county level estimates of child seat use; (2) to ensure a mix of population demographics; and (3) to allow for comparison of use rates across the state. For the 2002 survey, while all Oahu observation sites and seven neighbor island sites added to the survey in 2000 have remained the same, one neighbor island site was replaced by a new site due to low volume during the previous year. In general, the methods and procedures employed in this study have been maintained from previous years. A detailed map of locations for each shopping center can be found in Appendix B1 of this report. The following sites were selected for observation:

- (1) Ala Moana Shopping Center (Oahu);
- (2) Hawaii Kai Shopping Center (Oahu);
- (3) Kahala Mall (Oahu);
- (4) Koko Marina Shopping Center (Oahu);
- (5) Pearl Ridge Shopping Center (Oahu);
- (6) Waianae Mall (Oahu);
- (7) Waieke Shopping Center (Oahu);
- (8) Windward Mall (Oahu);
- (9) Kaahumanu Center (Maui);
- (10) Costco (Maui);
- (11) Hilo Walmart (Hawaii);
- (12) Kona Walmart (Hawaii);

- (13) Kona Coast Shopping Center (Hawaii);
- (14) Walmart (Kauai);
- (15) Kukui Grove Shopping Center (Kauai).

The observations were conducted by two-person teams. One team member was responsible for monitoring restraint use among vehicles with occupants under the age of 4. Infants and toddlers (0-3 years) were observed for child restraint use. A second team member recorded the information into a database using Palm handheld technology. Observers were stationed at the main entrance of each shopping mall on a weekend from 9 a.m. to 3 p.m. After the data were collected, it was entered into a database at DURP and analyzed using SAS, a statistical software package.

IV. FINDINGS

This section discusses the findings of the study in detail. The results of the analysis are discussed based upon five aspects of child restraint use. They are:

- (1) differences between infants and toddlers;
- (2) differences by site location;
- (3) differences by island;
- (4) changes since the last observation period;
- (5) child restraint relative to front seat occupant belt status; and
- (6) youth restraint levels.

(1) DIFFERENCES BETWEEN INFANTS AND TODDLERS

Infants are defined as children less than 1 year of age and toddlers are children between the ages 1 and 3. The results of the 2002 survey show that infants were restrained more often than toddlers. Of the 230 infants observed, 90.9% were restrained. In contrast, 59.5% of the 892 toddlers observed were restrained. Table 1 provides detailed information.

TABLE 1
PROPER RESTRAINT STATUS BY AGE GROUP, 2002

	Total Observed	Restrained		Unrestrained	
		Number Restrained	Percent Restrained	Number Unrestrained	Percent Unrestrained
Infants	230	209	90.9%	21	9.1%
Toddlers	892	531	59.5%	361	40.5%
Overall	1122	740	66.0%	382	34.0%

Figure 2 illustrates patterns among violators of Hawaii's child restraint laws. The 2002 survey found that unrestrained toddlers (40.5%) were more prevalent than unrestrained infants (9.1%). Those children categorized as unrestrained included those who were not securely harnessed in a child seat. Non-compliant infants and toddlers were grouped into several commonly observed categories of non-compliance. These categories include:

- (1) Unrestrained—child is completely unrestricted in the car; not restrained by a child safety seat or a safety belt.
- (2) Sitting on lap—child is sitting on an occupant's lap; not restrained in a safety seat;
- (3) Sitting on lap in safety seat—child is sitting in a safety seat which is being held in an occupant's lap; most commonly observed among infants sitting in a convertible seat.
- (4) Improperly harnessed—child is sitting in a safety seat but is not properly strapped in it (i.e., child is only restrained in the seat by a safety seat shield).
- (5) Unharnessed in seat—child is sitting in a safety seat but is not strapped to the seat or restrained by the safety shield.
- (6) Safety seat improperly attached—child is sitting in a safety seat but the seat is not properly attached to the vehicle.
- (7) Seat belt—child under the age of four is illegally restrained by a seat belt.

FIGURE 2
CATEGORIES OF NON-COMPLIANCE AMONG INFANTS AND TODDLERS, 2002

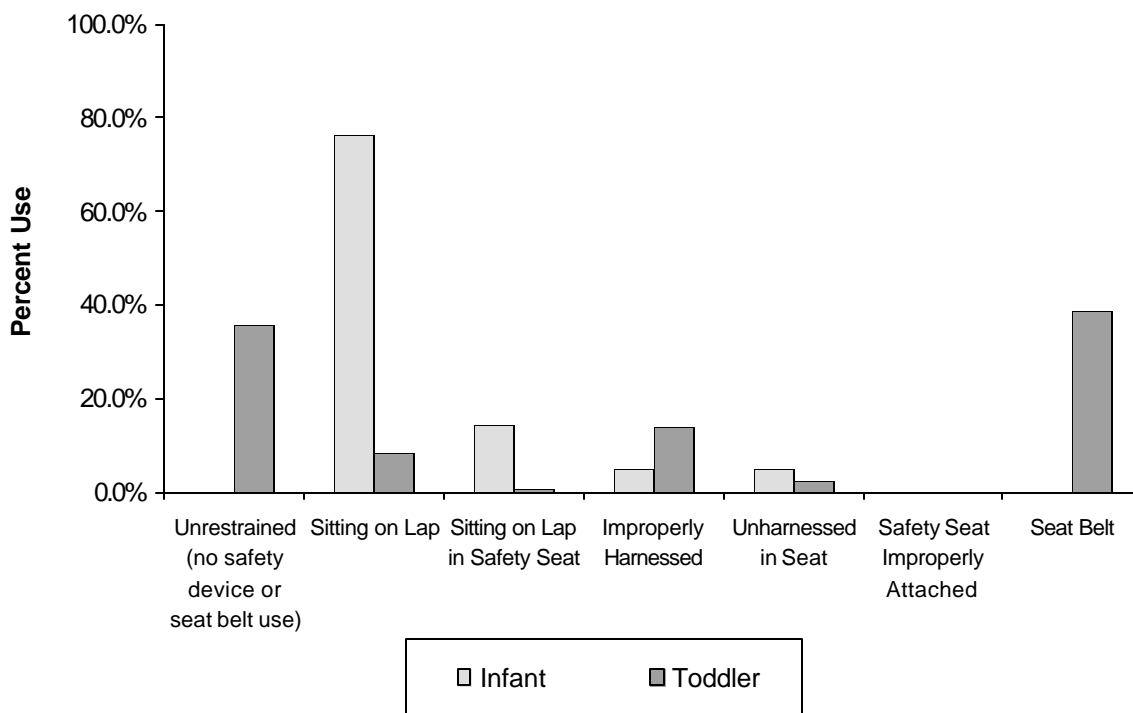


Table 2 shows the results of non-compliance among infants in detail. Of the 21 non-compliant infants observed, the majority (76.2%) sat in the lap of another occupant. Overall, however, the number of non-compliant infants was small in relationship to the 230 infants that were observed for the study. Table 2 breaks down the characteristics of non-compliance among infant passengers.

TABLE 2
UNRESTRAINED AND IMPROPERLY RESTRAINED INFANTS (<1 Year), 2002

	Number of Infants	Percent Distribution
Unrestrained (no safety seat)	0	0.0%
Sitting on Lap	16	76.2%
Safety Seat in Lap	3	14.3%
Improperly Harnessed	1	4.8%
Unharnessed in Safety Seat	1	4.8%
Safety Seat Improperly Attached to Vehicle	0	0.0%
Seat belted	0	0.0%
Total	21	100.0%

Table 3 shows that of the 361 improperly restrained toddlers observed, 35.7% were completely unrestrained. Toddlers using seat belts (38.8%), toddlers improperly harnessed in their safety seat (13.9%), and toddlers sitting on the lap of an occupant (8.6%) followed.

TABLE 3
UNRESTRAINED AND IMPROPERLY RESTRAINED TODDLERS (1-3 Years), 2002

	Number of Toddlers	Percent Distribution
Unrestrained (no safety seat)	129	35.7%
Sitting on Lap	31	8.5%
Safety Seat in Lap	3	0.8%
Improperly Harnessed	50	13.9%
Unharnessed in Safety Seat	8	2.2%
Safety Seat Improperly Attached to Vehicle	0	N/A
Seat belted	140	38.8%
Total	361	100.0%

In 2002, 90.9% of infants were in compliance with Hawaii's child safety seat law. However, not all of these cases met National Highway Traffic and Safety Administration (NHTSA) guidelines. According to these guidelines, proper child seat use requires that infants be placed in the back seat in a rearward-facing seat. The survey shows that of the 230 infants observed, only 30.1% were facing rearward, while 83.5% of all infants observed were in the back. Table 4 illustrates infant restraint use by location in the car (i.e., front seat and back seat) and positioning of the safety seat (i.e., forward, rearward, and sideward).

TABLE 4
INFANT RESTRAINT CHARACTERISTICS, 2002

Factors	INFANTS			Percentage of those Observed
	Restrained	Unrestrained	Observed	
LOCATION				
Front	34	4	38	16.5%
Back	175	17	192	83.5%
Total	209	21	230	100.0%
POSITION				
Forward	144	2	146	68.5%
Rearward	64	0	64	30.1%
Sideward	1	2	3	1.4%
Total	209	4	213	100.0%

2) DIFFERENCES BETWEEN LOCATIONS

Table 5 shows the differences in child restraint use between infants and toddlers at each location. Ala Moana Shopping Center (86.7%) on Oahu had the highest overall compliance rate. It was followed by Kauai's Kukui Grove Shopping Center (80.0%) and Pearlridge Shopping Center (79.7%). Infant use rates were highest at Oahu's Hawaii Kai Shopping Center (100%) and Kahala Mall, Hawaii's Hilo Walmart (100%), and Kauai's Kukui Grove Shopping Center (100%). Oahu's Waiekele Shopping Center (95.7%) and Hawaii's Kona Coast Shopping Center (94.4%) followed. This year, all infant child restraint use rates matched or exceeded the 75% mark. The lowest rate of infant child restraint was observed at Koko Marina Shopping Center on Oahu (75.0%).

Toddler restraint rates were much lower than those of infants. Toddlers were most frequently restrained at Ala Moana Shopping Center (86.1%) and Pearlridge Shopping Center (78.1%) on Oahu. Most of the reported restraint rates for toddlers were in the range of 38% to 71%. The lowest restraint rate was observed at Kaahumanu Shopping Center, where only 27.3% of toddlers were properly restrained.

TABLE 5
RESTRAINT BY LOCATION, 2002

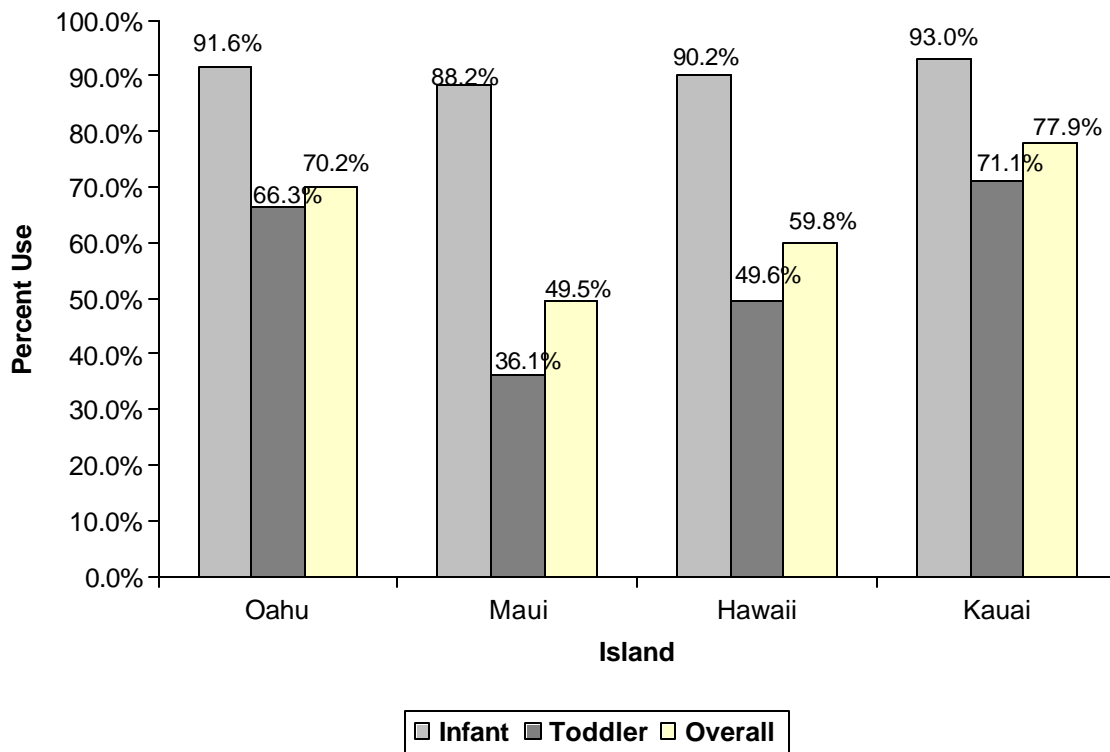
Site	Infants		Toddlers		Total	
	Restrained/ Observed	Percent Restrained	Restrained/ Observed	Percent Restrained	Restrained / Observed	Percent Restrained
Ala Moana	12/13	92.3%	118/137	86.1%	130/150	86.7%
Hawaii Kai	7/7	100.0%	40/86	46.5%	47/93	50.5%
Kahala Mall	4/0	100.0%	29/42	69.1%	33/46	71.7%
Koko Marina	6/8	75.0%	11/29	37.9%	17/37	46.0%
Pearlridge	9/10	90.0%	50/64	78.1%	59/74	79.7%
Waiekele	22/23	95.7%	36/59	61.0%	58/82	70.7%
Waianae	10/11	78.1%	9/19	47.4%	19/30	63.3%
Windward Mall	17/19	89.5%	55/89	61.8%	72/108	66.7%
Kaahumanu Mall (Maui)	19/21	90.5%	24/88	27.3%	43/109	39.5%
Costco (Maui)	26/30	86.7%	29/59	49.2%	55/89	61.8%
Walmart (Hilo, Hawaii)	4/4	100.0%	13/31	41.9%	17/35	48.6%

Walmart (Kona, Hawaii)	16/19	84.2%	21/44	47.7%	37/63	58.7%
Kona Coast Center (Hawaii)	17/18	94.4%	27/48	56.3%	44/66	66.7%
Walmart (Kauai)	22/25	88.0%	39/55	70.9%	61/80	76.3%
Kukui Grove Shopping Center (Kauai)	18/18	100.0%	30/42	71.4%	48/60	80.0%

(3) DIFFERENCES BETWEEN ISLANDS

Figure 3 shows the differences between infant and toddler use rates on each island. The compliance rate for infants was highest on Kauai (93.0%), followed by Oahu (91.6%), Hawaii (90.2%), and Maui (88.2%). Compliance rates for toddlers, however, were much lower. Kauai (71.1%) had the highest compliance rate for toddlers, followed by Oahu (66.3%), Hawaii (49.6%), and Maui (36.1%). Overall child restraint use rates for each island increased in 2002. Kauai's overall use rate was the highest, at 77.9%. Oahu (70.2%), Hawaii (59.8%), and Maui (49.5%) followed.

FIGURE 3
INFANT AND TODDLER RESTRAINT USE RATES BY ISLAND, 2002



(4) CHANGES SINCE THE LAST OBSERVATION PERIOD

Table 6 shows the changes observed in overall restraint use from 1990 through 2002. In 1992, overall child restraint use peaked at 66.7%. Results from the 2002 study showed promise as rates from this year established new peaks. While the overall restraint rate did not exceed the peak established in 1992, an impressive 66.0% restraint use rate was observed—thus making a 13% gain over the previous year (43.2%). A new peak was established in 2002, as compliance rates for infants increased from 68.1% in 1990 to 90.9% in 2002. In addition, the rate for toddlers reached a new high, with 59.5% (2002) of those observed being properly restrained.

TABLE 6

CHILD SAFETY RESTRAINT USE, 1990-2002

	1990	1991	1992	1993	1995	1997	1998	1999	2000	2001	2002
Infants	68.1%	59.7%	82.1%	84.1%	83.4%	77.9%	84.4%	82.1%	89.9%	81.8%	90.9%
Toddler s	57.3%	44.0%	59.0%	46.4%	25.6%	20.8%	37.0%	38.9%	46.0%	34.8%	59.5%
Overall	59.2%	55.3%	66.7%	58.5%	37.0%	31.4%	48.1%	47.8	54.0%	43.2%	66.0%

(5) CHILD RESTRAINT USE RELATIVE TO VEHICLE OCCUPANT BELT USE

Table 7 shows the relationship between the use of child restraints and the use of seat belts among adult front seat occupants. The results from the 2002 survey are consistent with previous surveys. Past results have shown that in general, when infants and toddlers are restrained, seat belt rates are higher among occupants. However, the difference between occupant belt rates with restrained and unrestrained infants and toddlers is noticeable, but not significant. In vehicles where drivers were belted, 93.0% of infant and toddler passengers were in compliance with child restraint laws. Conversely, in vehicles with an unbelted driver, restraint rates dropped to 86.2%. A similar pattern was observed among belted and unbelted passengers. In cars with a belted passenger, the restraint rate was 85.8%. Cars with an unbelted passenger had a child restraint rate of 78.3%.

TABLE 7
CHILD RESTRAINT USE BY FRONT-SEAT OCCUPANT BELT USE, 2002

	DRIVER				PASSENGER			
BELT STATUS	Belted	Not Belted	Total	Total Belted (%)	Belted	Not Belted	Total	Total Belted (%)
Restrained	688	52	740	93.0%	345	57	402	85.8%
Unrestrained	326	52	378	86.2%	191	53	244	78.3%

(6) BACK SEAT BELT USE AMONG YOUTH

The methodology employed for the back seat belt study was similar to the one employed for the separate child restraint use study.¹ Back seat belt use observations were conducted in tandem with child restraint use observations. For the back seat belt use observations, 15 shopping mall sites were selected throughout the state. Two trained observers were stationed at each site from 9 a.m. to 3 p.m. during the weekend. One member was responsible for observing the belt status of back seat occupants between

¹ See "Section III. Methodology" in *Results of the 2001 Hawaii Child Restraint Use Survey*.

the ages of 4 and 17 while the other recorded the data on a standardized survey form. The data were then processed and analyzed.

Figure 4 illustrates the overall back seat belt use rate among youth. Of the 1,422 youth observed, only 548—or 38.5%—were belted. However, this was an increase impressive gain over the 31.7% observed during the previous year. More than half of the youth observed in back seats were belted on Maui, making it once again the island with the highest reported seat belt rate among youth sitting in the rear. Of those observed, 57.6% were belted. Maui's belt use rate far exceeded the 41.9% reported on the island in the previous year. In addition, Maui continues to lead the state in terms of reported belt rates among youth sitting in the rear. Oahu youth followed with a much lower belt use rate of 38.7%. Hawaii trailed slightly behind with a 38.0% belt use rate. For the second year in a row, Kauai reported the lowest back seat belt use rate among youth, with only 24.6% of the youth observed buckling up. Table 8 summarizes the overall findings. For detailed maps of use rates by site, see Appendix B.

FIGURE 4
BACK SEAT BELT USE RATES AMONG YOUTH, 2002

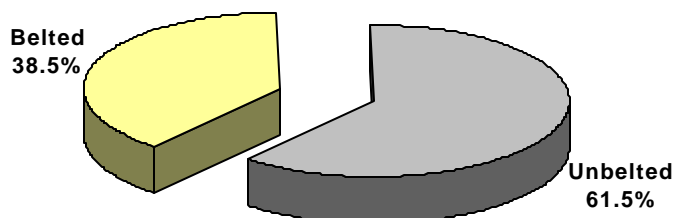


TABLE 8
BACK SEAT BELT USE AMONG YOUTH BY FACTORS, 2002

FACTORS	YOUTH			
	Restrained	Unrestrained	Observed	Percentage Restrained
BY WEATHER				

Sunny	416	577	993	41.9%
Cloudy	128	246	374	34.2%
Rainy	4	51	55	7.3%
BY ISLAND				
Oahu	310	492	802	38.7%
Maui	87	64	151	57.6%
Hawaii	101	165	266	38.0%
Kauai	50	153	203	24.6%
BY SITE				
Ala Moana, Oahu	83	76	159	52.2%
Hawaii Kai SC, Oahu	30	68	98	30.6%
Kahala Mall, Oahu	33	40	73	45.2%
Koko Marina, Oahu	12	15	27	44.4%
Pearlridge, Oahu	60	75	135	44.4%
Waialeale SC, Oahu	30	79	109	27.5%
Waianae Mall, Oahu	11	60	71	15.5%
Windward Mall, Oahu	51	79	130	39.2%
Kaahumanu Center, Maui	54	38	92	58.7%
Costco, Maui	33	26	59	55.9%
Walmart (Hilo), Hawaii	4	51	55	7.3%
Walmart (Kona), Hawaii	42	77	119	35.3%
Kona Coast SC, Hawaii	55	37	92	59.8%
Walmart, Kauai	29	69	98	29.6%
Kukui Grove SC, Kauai	21	84	105	20.0%

V. CONCLUSION AND RECOMMENDATIONS

The results of the 2002 Child Restraint Survey reveal that impressive gains were made in child restraint use from 2001. Between the years of 1997 to 2000, child restraint had steadily risen from 31.4% to 54.0%. In 2001, the rate dropped to 43.2%. In 2002, however, the rate once again rose to 66.0% and nearly reached the peak of 67.0% set in 1992. In addition, youth back seat belt rates also rose in the second year of the youth belt law's implementation, from 31.7% in 2001 to 38.5% in 2002. However, this figure is low in comparison to belt rates of front seat occupants.

Results from the 2002 survey show that compliance rates for toddlers have continued to climb from a low of 20.8% in 1997 to a new high of 59.5% in 2002. A new peak for infants was also established, as restraint rates for infants increased from 81.8% in 2001 to 90.9% in 2002. When comparing use rates by island, Kauai (77.9%) had the highest compliance rate overall. It should be noted that compliance rates among infants are still higher than among toddlers.

Based on these findings, several recommendations have been identified:

- (1) Further study is needed to analyze the variation in rates of compliance over the years. Research needs to be done to identify the factors that most significantly affect child restraint rates.
- (2) Programs of enforcement, public education, and public information should be developed in order to increase toddler compliance rates at all locations. While compliance rates among infants is relatively high, toddler rates lag far behind. Furthermore, child restraint laws must be actively enforced to increase compliance.
- (3) Differences across counties need further analysis. For instance, future studies can examine why Maui has higher back seat belt use rates among youth, yet has the lowest seat belt use rates in the state.
- (4) The percentage of youth wearing seat belts in the back seat continues to be low. This is only the second year the law has been in effect. Public awareness about the law needs to be raised and more enforcement needs to take place in order to increase back seat belt use rates among youth to levels observed among front seat occupants.

APPENDIX B1

INFANT & TODDLER RESTRAINT RATES

OAHU: MAP 1

MAUI: MAP 2

HAWAII: MAP 3

KAUAI: MAP 4

YOUTH BELT RATES

OAHU: MAP 5

MAUI: MAP 6

HAWAII: MAP 7

KAUAI: MAP 8